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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,100	12/15/2004	Andreas Thies	2004-256	5518
27569	7590	05/30/2008		
PAUL AND PAUL 2000 MARKET STREET SUITE 2900 PHILADELPHIA, PA 19103			EXAMINER MENDEZ, ZULMARIAM	
			ART UNIT 1795	PAPER NUMBER
			NOTIFICATION DATE 05/30/2008	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/518,100

**Applicant(s)**

THIES ET AL.

**Examiner**

ZULMARIAM MENDEZ

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-7 and 9-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-7 and 9-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 1, 3-7, and 9-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US Patent no. 4,445,990) in view of Mayer et al (US Patent no. 6,562,204).

With regard to claims 1 and 13, Kim discloses a method and apparatus for treating metal plating operation wastewater to remove undesired compounds (col. 2, lines 23-26) comprising at least one anode (50) and at least one cathode (44), wherein two reference electrodes (34 and 35) may be placed at the inlet and outlet sides, respectively, of electrolytic cell (20) to monitor voltage levels (col. 3, lines 22-24); and a voltmeter ( $V_3$ , 33) being provided between the anode and the first reference electrode (34), a voltmeter ( $V_1$ , 31) provided between the first and the second reference

electrodes (34 and 35), and a voltmeter ( $V_2$ , 32) provided between the second reference electrode and the at least one cathode (col. 3, lines 26-39). However, Kim fails to teach wherein the reference electrode is disposed at the surface of the anode and the cathode.

Mayer discloses an apparatus for potential controlled electroplating of fine patterns on semiconductor wafers comprising: at least one anode (7), which is a dimensionally stable metal and at least one cathode/wafer (8), at least one reference electrode (6) being disposed at the surface of the at least one anode or at the surface of the at least one cathode (see figure 1) in order to monitor and control the potential of the wafer (col. 5, lines 7-16) and for detecting the electric voltages between the reference electrode (6) and the cathode (8).

Therefore, one having ordinary skill at the time of the invention would have found it obvious to collocate the reference electrode at the surface of the anode or cathode, as taught by Mayer, in the electrolytic apparatus of Kim, in order to monitor and control the potential of the wafer as well as to detect the electric voltages between the reference electrode and the cathode.

With regard to claim 7, Kim discloses a method and apparatus for treating metal plating operation wastewater to remove undesired compounds (col. 2, lines 23-26) comprising at least one anode (50) and at least one cathode (44), wherein two reference electrodes (34 and 35) may be placed at the inlet and outlet sides, respectively, of electrolytic cell (20) to monitor voltage levels (col. 3, lines 22-24); and a voltmeter ( $V_3$ , 33) being provided between the anode and the first reference electrode

(34), a voltmeter ( $V_1$ , 31) provided between the first and the second reference electrodes (34 and 35), and a voltmeter ( $V_2$ , 32) provided between the second reference electrode and the at least one cathode (col. 3, lines 26-39); said method involves: providing an electric current flow between the at least one anode and at least one cathode (col. 3, lines 24-26); concurrently and directly measuring with a voltmeter the respective electric voltages between the at least one anode and the first reference electrode, between the first and second reference electrodes (34 and 35), and between the second reference electrode and the cathode (col. 3, lines 26-29). However, Kim fails to teach wherein the reference electrodes are disposed at the surface of the anode and the cathode.

Mayer discloses an apparatus for potential controlled electroplating of fine patterns on semiconductor wafers comprising: at least one anode (7), which is a dimensionally stable metal and at least one cathode/wafer (8), at least one reference electrode (6) being disposed at the surface of the at least one anode or at the surface of the at least one cathode (see figure 1) in order to monitor and control the potential of the wafer (col. 5, lines 7-16) and for detecting the electric voltages between the reference electrode (6) and the cathode (8).

Therefore, one having ordinary skill at the time of the invention would have found it obvious to collocate the reference electrode at the surface of the anode or cathode, as taught by Mayer, in the electrolytic apparatus of Kim, in order to monitor and control the potential of the wafer as well as to detect the electric voltages between the reference electrode and the cathode.

With regard to claims 3, 4, 9, and 10, Kim discloses all of the features, as discussed in claim 1 above, but fails to teach wherein the reference electrodes (34, 35) communicates through capillaries with the surface of the anode and cathode, providing electrolyte fluid through the capillaries. Mayer discloses wherein the reference electrode (6) consists of a capillary chamber containing a metal electrode. The electrolyte in the reference electrode chamber contains the same metal ions as the electrolyte in the electro-deposition bath. The capillary chamber has its opening near the wafer and terminates in close proximity to the wafer/cathode (col. 5, lines 53-57 and 63-67). There can be a plurality of reference electrodes, preferably having capillary outlets in the electroplating solution at various positions near the wafer to monitor the potential in the electroplating solution at different points in proximity to the wafer surface and can be used in a feedback manner (col. 6, lines 1-6). Thus, they can provide important information in controlling the electro-deposition process to achieve and maintain plating uniformity from the center of the wafer to its edges (col. 6, lines 6-9) without contaminating the electrodes.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to use a reference electrodes providing electrolyte fluid through capillaries to the surface of a cathode and anode, as taught by Mayer, in the electrolytic apparatus of Kim, in order to monitor the potential in the electroplating solution at different points in proximity to the wafer surface without contaminating the electrodes.

With regard to claims 5 and 11, the at least one anode (50) and cathode (44) of Kim, are paralleled and oriented horizontally (see figure 3).

With regard to claims 6 and 12, Kim discloses all of the features, as discussed in claim 1 above, but fails to teach wherein the cathode is a wafer or a chip carrier substrate, and the anode is a metal plate. However, Mayer discloses wherein the cathode is a wafer substrate (col. 4, lines 32-37) and the anode is a dimensionally stable metal anode such as a platinum or titanium anode (col. 5, lines 1-6). It is necessary that the anode is a source of metal cations to replenish the cations of electrolyte solution as they are deposited onto the substrate's surface (col. 5, lines 1-6).

Therefore, one having ordinary skill in the art at the time of the invention, would have found it obvious to use a metal anode while having a cathode behaving as a wafer since it is necessary that the anode is a source of metal cations in order to replenish the cations of electrolyte solution as they are deposited onto the substrate's surface.

With regard to claims 14 and 15, Kim discloses all of the structure, as discussed in claims 1 and 7 above, but fails to explicitly disclose wherein the reference electrodes (34 and 35) are stable reference electrodes. Mayer discloses wherein the reference electrode is calomel, which is well known in the art of being a stable reference electrode, or a copper metal electrode, among others (col. 5, lines 25-27) in order to maintain equilibrium with the electrodes and the electrolyte within the electrolytic process.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to use a stable reference electrode, as taught by Mayer, in the electrolytic apparatus of Kim, in order to maintain equilibrium with the electrodes and the electrolyte within the electrolytic process.

***Response to Arguments***

4. Applicant's arguments with respect to claims 1, 3-7, and 9-15 have been considered but are moot in view of the new ground of rejection necessitated by applicant's amendments. The applicant argues that Mayer et al (US Patent no. 6,562,204) alone or in combination with Langner (US Patent no. 4,834,842) does not teach or suggest all of the features as claimed in the present invention. However, this argument is moot in view of the new ground of rejection needed by the amendments as discussed above.

***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ZULMARIAM MENDEZ whose telephone number is (571)272-9805. The examiner can normally be reached on Monday-Thursday, 8:30am-5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Z. M./  
Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795